# Outbreak Summary 2003:
# The Old and the New

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The main objective of any communicable disease outbreak investigation is to identify the infectious agent and the causative factors in order to control the outbreak and prevent further disease transmission. Thorough investigations can also monitor emerging trends and provide a knowledge base to prevent similar occurrences in the future. Therefore, outbreaks or clusters of unusual disease incidence are reportable to the Indiana State Department of Health (ISDH) [IAC 410 1-2.3]. Outbreak investigations should be a collaborative effort between the local health departments (LDHs) and the ISDH. It is the LHD's responsibility to notify the ISDH of the outbreak and to perform the majority of investigative procedures, while the role of the ISDH is mainly coordination and consultation. In large or complex outbreak situations, the ISDH may provide direct or on-site assistance.

This narrative describes only those outbreak investigations in which the ISDH Epidemiology Resource Center (ERC) participated. The ERC investigated a total of 18 outbreaks in 2003 (Table 1), approximately half of the number of outbreaks investigated in 2002. This was due largely to the increased number of viral gastroenteritis outbreaks investigated in 2002. This figure does not include outbreaks investigated independently by LHDs.

Of the 18 reported outbreaks, three were non-gastrointestinal, and 15 were gastrointestinal. Of the gastrointestinal outbreaks, six were foodborne, eight were spread by person to person contact, and one had no conclusive transmission route. No waterborne outbreaks were reported in 2003. The Food Protection Program and Long Term Care Program, in addition to lending valuable expertise and experience during outbreak investigations, also investigate a substantial number of food-related complaints and other clusters of illness in which the ERC never becomes involved.

## Non-Gastrointestinal

An outbreak of **monkeypox** virus infection occurred in June 2003 from contact with an overseas shipment of infected animals imported into a Texas distributor and sold through an Illinois retailer. This was the first reported introduction of monkeypox into the Western Hemisphere, and several states were affected. Seven confirmed, five probable, and five suspect cases were identified in seven Indiana counties. All had contact with infected animals. Several cases were hospitalized. One case developed encephalitis, but no deaths were reported. A field team from the Centers for Disease Control and Prevention assisted the ISDH with the initial investigation and testing, and a separate field team conducted follow-up testing in August. The Indiana Board of Animal Health conducted animal tracing and issued an embargo on the sale, transportation, and display of imported "pocket pets" until the outbreak was declared over.

Twelve confirmed cases of infectious **mononucleosis** were identified in a Tippecanoe County school starting in June. All cases reported close contact with a previously ill case through school activities, athletics, or family gatherings.

In August, an outbreak of **Methicillin-Resistant *Staphylococcus aureus* (MRSA)** was reported in a university in Vigo County. Seven cases were laboratory confirmed, all of whom participated on the same football team. All cases reported infected skin lesions, and all cases tested culture positive. Genetic fingerprint analysis revealed that six cases were infected with the same strain. Cases reported direct contact with one another, including the sharing of towels.

## Gastrointestinal

### Viral

As in 2002, more outbreaks investigated in 2003 were attributed to **noroviruses** than any other agent. Three confirmed and five suspected outbreaks of norovirus infection occurred in Indiana. Settings included long-term care facilities, restaurants/caterers, and hospitals.

Noroviruses are the most common causes of acute gastroenteritis in the U.S. and are easily transmitted by contaminated food and beverages. Foodborne viral outbreaks usually occur when an infected person handles raw foods (salads, vegetables, etc.) or ready-to-eat foods (sliced luncheon meats, rolls, etc.) without thoroughly washing hands after using the restroom. Due to the extremely infectious nature of viral agents, noroviruses can also easily be transmitted from person to person via contaminated hands or surfaces, and evidence suggests that these viruses may also be transmitted through inhalation of vomitus. One of the outbreaks was foodborne, and seven were attributed to person to person contact. In most outbreaks, there was a background of illness among food handlers or contact with others ill prior to the outbreak. The inoculum dose is extremely low (approximately 50 viral particles). Symptoms include watery diarrhea, nausea and vomiting, generally within 24-48 hours after exposure. Those infected can continue to shed virus in stool up to two weeks after symptoms cease. The viruses are environmentally hardy, surviving freezing, temperatures to 60°C, and chlorine levels to 10 ppm.

### Bacterial Intoxications

In February 2003, an outbreak occurred among patrons who ate at a local restaurant in Clark County. Eight cases were identified, but specimens for laboratory testing were not available. According to the clinical information provided, illness was most likely intoxication caused by ***Bacillus cereus***. *B. cereus* is commonly found in soil. The bacterial cells form spores that allow the organism to survive periods of environmental stress, such as temperature extremes and dryness. Illness occurs when food contaminated by soil is held under conditions favorable for multiplication of the organism, and illness is usually associated with inadequately heated, cooled, or reheated “dense” foods such as meats, stews, and gravies. Once ingested, the organism replicates in the gastrointestinal tract and produces an enterotoxin that causes the characteristic symptoms. The illness is not transmissible person to person. Fried rice and grain-based foods are common vehicles. In this outbreak, rice was the only common food vehicle. No stool specimens or food samples were available to confirm an agent.

In 2003, ***Clostridium perfringens*** was confirmed in one outbreak and suspected in another. C. *perfringens* is a bacterium found in soil and the gastrointestinal tract of healthy people and animals, including cattle, pigs, poultry, and fish. The bacterial cells form spores that allow the organism to survive periods of environmental stress, such as temperature extremes and dryness. Illness occurs when food contaminated by soil or feces is held under conditions favorable for multiplication of the organism, and illness is usually associated with inadequately heated, cooled, or reheated “dense” foods such as meats, stews, and gravies. Once ingested, the organism replicates in the gastrointestinal tract and produces an enterotoxin that causes the characteristic symptoms. The illness is not transmissible person to person.

A confirmed outbreak of *C. perfringens* associated with a dinner at a civic organization in St. Joseph County occurred in March. Fourteen cases were identified, and two tested positive for *C. perfringens*. The clinical syndrome reported was also compatible with this organism. Noodles in sauce from the dinner tested positive for *C. perfringens*. Statistical analysis to identify a food vehicle indicated that sausage was likely associated with illness. Although the sausage tested negative for *C. perfringens*, toxins and pathogens are often unequally distributed in food. In addition, statistical analysis was difficult to perform due to the small sample size. Bacteria were most likely introduced to other food items through cross-contamination, and bacterial proliferation most likely occurred through inadequate cooling and cold-holding temperatures.

In October, a suspected outbreak of *C. perfringens* occurred following a catered dinner in Henry County. Thirty-four cases were identified, and the clinical syndrome was most compatible with *C. perfringens*. No stool specimens were available for laboratory confirmation. No food samples were available for laboratory analysis; however, statistical analysis revealed that chicken casserole was most likely associated with illness. Patrons reported that food was not hot and did not appear to have temperature control. An unlicensed caterer prepared meal items at a private residence, so food preparation practices were not regulated. The local health department issued a cease-and-desist order to the caterer to stop preparing food for commercial purposes.

## Bacterial Infections

In August, an outbreak of *Shigella sonnei* was confirmed in a Tippecanoe County daycare. Foodborne outbreaks of shigellosis usually occur when an infected person handles raw or ready-to-eat foods without thoroughly washing hands after using the restroom. Due to the extremely infectious nature of the bacteria, shigellosis can also easily be transmitted from person to person via contaminated hands or surfaces. The inoculum dose is extremely low (10-100 bacteria), and without proper antibiotic treatment, bacterial shedding can continue up to one month after symptoms cease. This outbreak was most likely introduced into the facility by an ill child or staff member and transmitted person to person. Several children were reported ill with diarrheal symptoms but not excluded or treated. One child and one employee tested positive, and eight other children with compatible symptoms were identified. Control measures included parent education, exclusion, adequate hand-washing practices, proper disinfection, and mandatory stool testing to identify asymptomatic carriers.

Two confirmed foodborne outbreaks of **salmonellosis** occurred in 2003. *Salmonella* bacteria are commonly found in poultry, eggs, cattle, pigs, and reptiles. Foodborne illness due to *Salmonella* usually results from inadequate cooking, temperature abuse, and cross-contamination of foods. Foodborne illness can also occur when an infected person handles raw or ready-to-eat foods without thoroughly washing hands after using the restroom. Over 3,000 serotypes of *Salmonella* have been identified, and knowledge of serotypes can help identify food vehicles. *Salmonella* can also be transmitted person to person.

One outbreak occurred following a private dinner in Marion County in January. Thirteen people were reported ill, and five tested positive for *Salmonella typhimurium, variant Copenhagen.* No food samples were available for laboratory analysis, and due to the small sample size, statistical analysis to determine a food vehicle could not be performed. However, the one food item common to all cases was stuffing. Since the food items were prepared in private homes, information regarding food preparation methods was unavailable. Four secondary cases, all of whom reported having prior contact with someone who ate the dinner, were also identified.

Another outbreak was associated with a Hendricks County restaurant in August. Four patrons and one employee tested positive for *Salmonella enteritidis*. Genetic fingerprint analysis conducted on three of the specimens indicated an identical strain, although this strain is common. All cases had consumed food from the restaurant prior to illness, although no common food items were identified. The one employee who tested positive worked as a server at the restaurant. Two other food handlers with compatible symptoms were also identified but not tested. This suggested a background of illness among restaurant employees, and multiple opportunities existed for bare-hand contact of various food items.

## Outbreak Investigation

Based on experiences in disease investigation, the ISDH makes the following recommendations to local health departments for efficient and scientifically sound disease investigations:

- *Maintain supplies for outbreak investigations.* Local health departments should have adequate supplies necessary for outbreak investigations. **Containers for collecting stool specimens specific for bacterial and viral pathogens (7A) should be readily available. Be sure to check the expiration dates on the containers.** New containers can be ordered or expired ones replaced by calling the ISDH Container Section at (317) 233-8104. Call (317) 233-7740 for information regarding specimen collection for respiratory outbreaks.
- *If an outbreak is suspected, contact the ISDH field epidemiologist in your District as soon as possible.* Gather basic information about the outbreak beforehand. For foodborne outbreaks, this information includes:

    - Type of event, location, date, number of meal(s) served and time of meal(s)
    - Source of food served (caterer, home, etc.) and contact person for the source
    - Number of exposed persons
    - Number of known ill persons
    - Range and times of illness onset
    - Main symptoms
    - Contact person for ill persons and phone number, if possible
    - Menu of all food and beverage items served
    - Availability of clinical and food samples

    For respiratory outbreaks, obtain the following information:

    - Location of outbreak
    - Number of known ill persons
    - Range and times of illness onset
    - Main symptoms
    - Contact person for ill persons and phone number, if possible
    - Any laboratory results already obtained by private physicians
    - Availability of clinical samples (i.e., are people still becoming ill)

- *Ensure that everyone involved in the process is working together.* This may involve initial and even daily meetings among environmental and nursing staffs. Both public health nurses and environmental health specialists have a critical role to play in outbreak investigations.

# SUMMARY OF DISEASE OUTBREAKS INVESTIGATED BY THE ISDH EPIDEMIOLOGY RESOURCE CENTER

## INDIANA, 2003

| Month | County | Site | Description | Organism[1] | Most probable source | Local Participation | Comments[2] |
|---|---|---|---|---|---|---|---|
| January | Marion | Long-term care facility | Gastroenteritis 60 cases | Unknown | Community | Marion CHD | Probably viral |
| January | Tippecanoe | Long-term care facility | Gastroenteritis 57 cases | Norovirus | Community | Marion CHD | 1 case confirmed |
| January | Marion | Assisted living facility | Gastroenteritis 61 cases | Norovirus | Infected staff member or community | Marion CHD | 2 cases confirmed |
| January | Decatur | Long-term care facility | Gastroenteritis 35 cases | Unknown | Community | Decatur CHD | Probably viral |
| January | Steuben | Assisted living facility | Gastroenteritis 39 cases | Norovirus | Community | Steuben CHD | 1 case confirmed |
| January | Marion | Private residence | Gastroenteritis 13 cases | *Salmonella typhimurium var. Copenhagen* | Stuffing | Marion CHD | 5 cases confirmed |
| February | Clark | Restaurant | Gastroenteritis 8 cases | Unknown | Rice | Clark CHD | Probably *B. cereus* |
| February | Marshall | Restaurant | Gastroenteritis 9 cases | Unknown | Unknown | Marshall CHD | Probably viral |
| March | St. Joseph | Civic organizatio n | Gastroenteritis 14 cases | *Clostridium perfringens* | Noodles in sauce | St. Joseph CHD | 2 cases confirmed |

| Month | County | Site | Description | Organism[1] | Most probable source | Local Participation | Comments[2] |
|---|---|---|---|---|---|---|---|
| June | Adams<br>Hancock<br>Johnson<br>Marion<br>Randolph<br>LaPorte<br>Vigo | Various | Rash illness<br>17 cases | Monkeypox virus | Infected animals | Adams CHD<br>Hancock CHD<br>Johnson CHD<br>Marion CHD<br>Randolph CHD<br>LaPorte CHD<br>Vigo CHD<br>Jay CHD | 7 confirmed<br>5 probable<br>5 suspect |
| June | St. Joseph | Restaurant | Gastroenteritis<br>5 cases | Unknown | Unknown | St. Joseph CHD | Transmission route unknown |
| June | Tippecanoe | School | Mononucleosis<br>12 cases | Epstein-Barr virus | Infected case | Tippecanoe CHD | 12 cases confirmed |
| August | Tippecanoe | Daycare center | Gastroenteritis<br>10 cases | *Shigella sonnei* | Infected child or staff member | Tippecanoe CHD | 2 cases confirmed |
| August | Allen | Athletic stadium | Gastroenteritis<br>14 cases | Unknown | Infected family member | Allen CHD | Probably viral |
| August | Hendricks | Restaurant | Gastroenteritis<br>7 cases | *Salmonella enteritidis* | Infected staff member | Hendricks CHD | 5 cases confirmed |
| August | Vigo | University | Skin infections<br>6 cases | Methicillin-resistant *Staphylococcus aureus* | Infected case | Vigo CHD | 6 cases confirmed |
| September | Lake | Hospital | Gastroenteritis<br>12 cases | Unknown | Infected patient | Lake CHD | Probably viral |
| October | Henry | Caterer | Gastroenteritis<br>34 cases | Unknown | Chicken casserole | Henry CHD | Probably *Clostridium perfringens* |

**1. Organisms culture-confirmed from stool samples, foods, other environmental sources, or determined by serologic testing.**
**2. Assessment of likely etiology based on incubation period, distribution of cases, and spectrum of symptoms shown.**
**CHD = County Health Department**